

# Supplementary Information

to *Systematic Review and Meta-Analyses of Studies Analysing Instructions to Authors from 1987 to 2017* by Mario Malički, Ana Jerončić, IJsbrand Jan Aalbersberg, Lex Bouter, and Gerben ter Riet.

This supplement is divided in two sections: Section 1 refers to tables and figures referenced in the systematic review results and narrative summary; while Section 2 includes detailed information on the series of meta-analyses we conducted. Table of contents is presented below.

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## Section 1. Systematic Review

**Supplementary Table 1.** Factors explored as possible determinants of topics being addressed in journals' Instructions to Authors (N=153).

| <b>Factor</b>   | <b>n</b> | <b>%</b> |
|---|----------|----------|
| Impact Factor   | 30       | (19)     |
| Subdiscipline (e.g., Cardiology vs General Medicine)                | 26       | (16)     |
| Region/Country  | 14       | (9)      |
| ICMJE endorsement   | 9        | (5)      |
| Database indexation (e.g., AIM vs non-AIM)                          | 8        | (5)      |
| Publisher   | 7        | (4)      |
| Discipline (e.g., Humanities vs Health)                             | 5        | (3)      |
| Publishing model (e.g., Open Access vs non-OA)                      | 4        | (2)      |
| Publication Language  | 2        | (1)      |
| Committee on Publication Ethics Membership                          | 1        | (0)      |
| Qualis Classification   | 1        | (0)      |
| Journal published by or in association with any medical association | 1        | (0)      |
| World Association of Medical Editors Membership                     | 1        | (0)      |
| Journal's Age   | 1        | (0)      |
| Korean Medical Association Membership                               | 1        | (0)      |

Abbreviations: AIM - ICMJE - International Committee of Medical Journal Editors, Abridged Index Medicus, Quails - Brazilian government classification system of scientific productions

**Supplementary Table 2.** Primary objectives listed in studies (N=153) analysing journals' Instructions to Authors (ItAs).

| <b>Objective</b>   | <b>n</b> | <b>%</b> |
|--|----------|----------|
| To determine if and how topics are addressed in ItAs   | 54       | (35)     |
| To determine the reporting or citation of topics in manuscripts and addressing of topics in ItAs | 51       | (33)     |
| To recommend standards for topics  | 11       | (7)      |
| To determine factors associated with differences in ItAs   | 9        | (6)      |
| To raise awareness of a topic(s) and its mention in ItAs   | 8        | (5)      |
| To determine changes in ItAs over time   | 7        | (4)      |
| To determine addressing of a topic(s) in ItAs and policy documents                               | 5        | (3)      |
| To improve the quality of journals within a country  | 4        | (3)      |
| To determine if ItAs can be a proxy for journal quality and library subscription decisions       | 2        | (1)      |
| To determine if there is a standard way of addressing a topic                                    | 1        | (0)      |
| To determine how authors deal with differences in ItAs between journals                          | 1        | (0)      |
| To provide guidance on writing and updating ItAs   | 1        | (0)      |

**Supplementary Table 3.** Cohort studies that analysed changes in journals' Instructions to Authors (ItAs) over time.

| Ref.   | Discipline      | No. of journals analysed | Journal selection method                                   | Topic analysed within instructions to authors                            | Percentage of journals' instructions mentioning the topic in a given year |           |       | Change |
|--------|-----------------|--------------------------|--|--|---|-----------|-------|--------|
|        |                 |                          |  |  | 1976  | 1985/1986 |       |        |
| 23     | Health Sciences | 93                       | All journals from <i>Abridged Index Medicus</i>            | Peer Review  | 23  | 68        |       | ↑      |
|        |                 |                          |  | Ethics   | 28  | 44        |       | ↑      |
|        |                 |                          |  | Journal's Scope  | 19  | 44        |       | ↑      |
|        |                 |                          |  | Average page length of instructions                                      | 1.27  | 1.5       |       | ↑      |
|        |                 |                          |  |  | 1982*   | 1992*     | 2001* |        |
| 38     | Life Sciences   | 23                       | Journals with most papers containing the keyword "GenBank" | Requiring deposit of sequence data into a genomic and proteomic database | 0   | 78        | 100   | ↑      |
|        |                 |                          |  |  | 1988-1991   | 1994/1995 |       |        |
| 25, 31 | Health Sciences | 50,60 (38) ‡             | CENDIS database  | Type of article accepted   | 82  | 63        |       | ↓      |
|        |                 |                          |  | Symbols and abbreviations  | 34  | 52        |       | ↑      |
|        |                 |                          |  | Abstract word limit  | 90  | 93        |       | ↑      |
|        |                 |                          |  | Structure of the abstract  | 86  | 73        |       | ↓      |
|        |                 |                          |  | Statistics   | 12  | 12        |       | =      |
|        |                 |                          |  |  | 1995  | 2005      |       |        |
| 75     | Health Sciences | 103                      | All journals from <i>Abridged Index Medicus</i>            | Ethics Approval  | 42  | 76        |       | ↑      |
|        |                 |                          |  | ICMJE URM  | 17  | 4         |       | ↓      |
|        |                 |                          |  | Declaration of Helsinki  | 3   | 4         |       | ↑      |
|        |                 |                          |  | Informed Consent   | 9   | 1         |       | ↓      |
|        |                 |                          |  | Conflict of Interest   | 75  | 94        |       | ↑      |
|        |                 |                          |  | Definition of Authorship   | 40  | 72        |       | ↑      |
|        |                 |                          |  | Prohibiting Simultaneous Submission                                      | 90  | 96        |       | ↑      |
|        |                 |                          |  | Prohibiting Duplicate Publication  | 88  | 95        |       | ↑      |
|        |                 |                          |  |  | 1995  | 2006      |       |        |
| 26, 60 | Health Sciences | 102/101†                 | All journals from <i>Abridged Index Medicus</i>            | Ethics Approval  | 47  | 83        |       | ↑      |
|        |                 |                          |  | Guidelines for research on humans  | 76  | 92        |       | ↓      |
|        |                 |                          |  | Declaration of Helsinki  | 3   | 3         |       | =      |
|        |                 |                          |  | Informed Consent   | 10  | 1         |       | ↓      |
|        |                 |                          |  | ICMJE URM  | 15  | 5         |       | ↓      |
|        |                 |                          |  |  | 2000  | 2005      | 2010  |        |
| 91     | Health Sciences | 9                        | JCR General Medicine Category                              | Acknowledgments  | 33  | 44        | 44    | ↑      |
|        |                 |                          |  | Authorship   | 55  | 55        | 55    | =      |
|        |                 |                          |  | Conflict of Interest   | 66  | 77        | 77    | ↑      |
|        |                 |                          |  | Declaring Funding  | 88  | 88        | 66    | ↓      |
|        |                 |                          |  | ICMJE Authorship   | 33  | 33        | 33    | =      |
|        |                 |                          |  | Ethics Approval  | 44  | 44        | 55    | ↑      |
|        |                 |                          |  | Reporting Guidelines   | 11  | 44        | 44    | ↑      |
|        |                 |                          |  | Trial Registration   | 0   | 11        | 33    | ↑      |
|        |                 |                          |  |  | 2000  | 2005/2006 |       |        |

|             |                 |              |   |                                      |                  |                  |             |
|-------------|-----------------|--------------|---|--------------------------------------|------------------|------------------|-------------|
| 39, 59      | Social Sciences | 34/31†       | Magazines for Libraries list of Library and information journals        | Web site persistence (i.e., DOI)     | 0                | 10               | ↑           |
|             |                 |              |   | Referencing electronic resources     | 18               | 39               | ↑           |
| 43, 61, 162 | Health Sciences | 167/165/168† | JCR's top 5 from 33 med. spec. and top 15 general and internal medicine |                                      | <b>2003</b>      | <b>2007</b>      | <b>2014</b> |
|             |                 |              |   | CONSORT                              | 22               | 38               | 63          |
|             |                 |              |   | ICMJE URM                            | 43               | 42               | 77          |
|             |                 |              |   | Trial Registration                   | NR               | 37               | 63          |
| 67, 115     | Health Sciences | 65/67†       | Indian medical journals identified in 5 bibliographic databases         |                                      | <b>2004/2005</b> | <b>2007/2008</b> |             |
|             |                 |              |   | CONSORT                              | 31               | 33               | ↑           |
|             |                 |              |   | ICMJE URM                            | 58               | 52               | ↓           |
|             |                 |              |   | Ethics Approval                      | 55               | 70               | ↑           |
|             |                 |              |   | Trial Registration                   | 2                | 16               | ↑           |
| 85, 134     | All sciences    | 163, 289†    | All journals from the central portal of Croatian scientific journals    |                                      | <b>2008</b>      | <b>2013</b>      |             |
|             |                 |              |   | Policy for m. submissions by editors | 0                | 1                | ↑           |
|             |                 |              |   | ICMJE URM                            | 8                | 5                | ↓           |
|             |                 |              |   | COPE                                 | 1                | 4                | ↑           |
| 141, 103    | Health Sciences | 134          | JCR Surgery Category  |                                      | <b>2011</b>      | <b>2014</b>      |             |
|             |                 |              |   | CONSORT                              | 30               | 42               | ↑           |
|             |                 |              |   | PRISMA/QUORUM                        | 10               | 19               | ↑           |
|             |                 |              |   | Trial Registration                   | 33               | 42               | ↑           |

\*The study reported mentioning of data deposit for each year from 1982 to 2001, we divided it into these 3 time periods to match the other studies.

† Some of the journals ceased publication over time or split into two journals.

‡ The study used the same methods of selecting journals, all indexed in the national database, while 50 journals were indexed when the first study was conducted, 60 were indexed when the follow up was done, of which 38 overlap, however data for just the 38 were not available. Additionally, the study also reported details of manuscript formatting that are not included in the table.

Acronyms: ICMJE URM - The International Committee of Medical Journal Editors Uniform Requirement for Manuscripts, JCR – Journal Citation Reports, CONSORT - Consolidated Standards of Reporting Trials, COPE - Committee on Publication Ethics, PRISMA/QUORUM - Preferred Reporting Items for Systematic Reviews and Meta-Analyses/Quality of Reporting of Meta-analyses, DOI - Digital Object Identifier, CENDIS – Centro Nacional de Informacion y Documentacion en Salud – Mexican National Center for Health Information and Documentation.

**Supplementary Table 4.** Studies that analysed differences in manuscripts in relation to the content of Instructions to Authors (ItAs).

| Ref. | Discipline      | No. of journals (no. of manuscripts) analysed |                             | Topic(s) (evaluation method, min – max score)                          | Reported Means, N or % for Journals   |                                    | P (value or range)  |
|------|-----------------|---|-----------------------------|--|---|------------------------------------|---------------------|
|      |                 | Addressing the topic(s)                       | Not addressing the topic(s) |  | Addressing the topic(s)   | Not addressing the topic(s)        |                     |
| 142  | Health Sciences | 7 (171)                                       | 30 (232)                    | CONSORT checklist items score (1-84)                                   | M=29.47   | M=25.57                            | NR                  |
|      |                 |   |                             | JADAD score (1-5)  | M=2.53  | M=1.97                             | NR                  |
| 67   | Health Sciences | 20 (31)                                       | 45 (120)                    | CONSORT items score (1-13)   | M=5.55  | M=4.93                             | 0.15                |
|      |                 |   |                             | JADAD score (1-5)  | M=2.03  | M=1.76                             | 0.21                |
| 128  | Health Sciences | 5 (29)  | 42 (141)                    | Race and ethnicity features  | 1 (3%) to 26 (90%) articles   | NR                                 | 0.000 to 0.521      |
|      |                 |   |                             | Limitations  | 13 (45%) articles   | NR                                 | 0.008               |
|      |                 |   |                             | Hypothesis   | 10 (34%) articles   | NR                                 | 0.730               |
| 100* | Health Sciences | 2 (327)                                       | 2 (437)                     | CONSORT for Abstracts (0-9)  | Pre-implementation M=2.56   | Post-implementation M=5.41         | 0.0037              |
| 120* | Health Sciences | NR  | NR                          | CONSORT-NPT item Adherence   | Pre-implementation 31%  | Post-implementation 34%            | 0.4592              |
|      |                 |   |                             | STRICTA item Adherence   | Pre-implementation 58%  | Post-implementation 79%            | 0.0042              |
| 63   | Health Sciences | 4 (8)   | 44 (34)                     | OQAQ Methodologic Quality (1-9)  | M=8.5   | M=4.6                              | <0.001              |
|      |                 |   |                             | OQAQ Question 10 (1-7)   | M=5.0   | M=2.4                              | <0.001              |
|      |                 |   |                             | OQAQ Methodologic Errors (%) <sup>‡</sup>                              | 1 (13%) Major e. 7 (87%) Minor e.   | 26 (76%) Major e. 8 (24%) Minor e. | <0.001              |
|      |                 |   |                             | Adherence to QUOROM (1-18)   | M=16.1  | M=9.3                              | <0.001              |
|      |                 |   |                             | Adherence to ethics approval and informed consent                      | OR 0.32 for journals addressing the topics (95% CI 0.15-1). “68% articles are less likely to report topics when the journals have not addressed them” |                                    | 0.05                |
| 159  | Health Sciences | 18 (18)                                       | 18 (18)                     | STREGA (% for 22 items)  | 63%   | 56%                                | 0.04                |
| 168  | Health Sciences | 7 (13)  | 21 (40)                     | Adherence to CONSORT-PRO   | 3 predictors of adherence score: ‘citing CONSORTPRO’, ‘journal endorsing CONSORT-PRO’ and ‘dedicated PRO paper’ (R <sup>2</sup> = 0.48)               |                                    | <0.001              |
| 130  | Health Sciences | 8 (8)   | 4 (4)                       | No. of journals using textual alternatives to figures on article pages | 0   | 3                                  | 0.0182 <sup>†</sup> |
|      |                 |   |                             | No. of journals using alternatives to figures in PDF(s)                | 8   | 3                                  | 0.333               |
| 110* | Health Sciences | 9 (15)  | 9 (30)                      | PRISMA Adherence (%)   | Pre-implementation 83.1%  | Post-implementation 90.1%          | 0.003               |
|      |                 |   |                             | AMSTAR Adherence (%)   | Pre-implementation 74.6%  | Post-implementation 85%            | 0.002               |
|      |                 | 9 (30)  | 61 (30)                     | PRISMA Adherence (%)   | 90.6%   | 85.3%                              | 0.003               |
|      |                 |   |                             | AMSTAR Adherence (%)   | 85.3%   | 76.9%                              | 0.016               |
| 160  | Health Sciences | 5 (69)  | 5 (151)                     | Reporting of confounding   | Md=4  | Md=4                               | 0.33                |

| based on<br>STROBE (1-8) |                   |              |              |                                  |   |        |
|--------------------------|-------------------|--------------|--------------|----------------------------------|---|--------|
| 111                      | Health Sciences   | Not reported | Not reported | Trial Registration               | No difference in the proportion of registered trials between journals that required trial registration and those that did not.  | 0.073  |
| 171                      | Health Sciences   | 30 (37)      | 77 (37)      | PRISMA (adherence %)             | 64.9%   | 73.0%  |
|                          |                   |              |              | AMSTAR (adherence %)             | 18.2%   | 18.2%  |
| 106                      | Social Sciences   | 26 (737)     | 46 (433)     | Supplementary Materials Guidance | All journals published manuscripts with supplementary materials.  | >0.05† |
| 129                      | Physical Sciences | 0-6 (NR)     | 5-11 (NR)    | Image accessibility issues       | Image accessibility issues were mostly inconsistent with ItAs   | NR     |
| 83                       | Health Sciences   | 6 (149)      | 44 (351)     | Data Sharing                     | 208 (59%) of 351 articles did not fully adhere to data availability instructions of the journals they were published in. None of 149 articles of journals that had no policies shared primary data. | NR     |

\*Measured adherence before and after introduction of guideline endorsement at a journal

† Not reported in the article, calculated using Fisher exact test

‡ Studies were deemed to contain major methodological errors if the overall *Overview Quality Assessment Questionnaire* score (range 1 to 10) was less than or equal to 3, or minor if the was greater than or equal to 4.

Acronyms: AMSTAR - A Measurement Tool to Assess the Methodological Quality of Systematic Reviews, CONSORT - The Consolidated Standards of Reporting Trials Statement, CONSSORT-NPT- CONSORT for Non-Pharmacological Trials, CONSORT-PRO – CONSORT Patient Reported Outcomes statement, JADAD Scale - 5-point scale for evaluating the quality of randomized trials, NR – Not Reported, OQAQ - Overview Quality Assessment Questionnaire, QUOROM - Quality of Reporting of Meta-Analyses guidelines, STREGA - Strengthening the Reporting of Genetic Association studies, STROBE - Strengthening the Reporting of Observational studies in Epidemiology

**Supplementary Table 5.** Studies that analysed if published articles adhere to requirements stated in journals' Instructions to Authors (ItAs).

| Ref. | Discipline      | No. of journals (manuscripts) | Topic(s)                                     | Results (no. and % of manuscripts addressing the topic or outcomes reported) | Optimal Adherence (> 80% of Manuscripts) |
|------|-----------------|-------------------------------|--|--|--|
| 132  | Health Sciences | 3 (50)                        | CONSORT Flow Diagram                         | 16 (32)  | No                                       |
|      |                 |                               | Trial Registration                           | 0 (0)  | No                                       |
| 107  | Social Sciences | 11 (239)                      | Reporting of RCTs (7 different guidelines)   | Trials reported a mean of 42% of reporting standards                         | No                                       |
| 154  | Health Sciences | 8 (90)                        | CONSORT item Adherence                       | Randomization 70%, Allocation 45%, Blinding 52%, Flowchart 91%               | For some items                           |
|      |                 |                               | Ethics Approval                              | 118 (22)   | No                                       |
| 74   | Health Sciences | 4 (534)                       | Informed Consent                             | 135 (25)   | No                                       |
|      |                 |                               | Ethics Approval and Informed Consent         | 74 (14)  | No                                       |
| 138  | Health Sciences | 6 (434)                       | Conflicts of Interest Disclosure per Journal | 98-100%  | Yes                                      |
|      |                 |                               | Funding Disclosure per Journal               | 41-100%  | For some items                           |
| 44   | Health Sciences | 27 (304)                      | Abstract Structure conforming to ItAs        | For 26 out of 27 journals almost all abstracts conformed to ItA instructions | Yes                                      |
| 52   | Health Sciences | 3 (190)                       | Abstract Structure conforming to ItAs        | 20% to 56% of articles conformed to ItA instructions                         | No                                       |
| 55   | Health Sciences | 18 (71)                       | Conflicts of Interest Disclosure             | 11 (15)  | No                                       |
| 135  | Health Sciences | 3 (36)                        | CONSORT Item Adherence                       | Item adherence ranged from 22% to 100%                                       | For some items                           |
|      |                 | 1 (28)                        | CONSORT-NPT Total Score                      | Overall adherence ranged from 21% to 57%                                     | No                                       |
| 120  | Health Sciences | 1 (28)                        | CONSORT-NPT item Adherence                   | Adherence ranged from 0% to 100%   | For some items                           |
|      |                 | 1 (24)                        | STRICTA Total Score                          | Overall adherence ranged from 41% to 100%                                    | No                                       |
|      |                 | 1 (24)                        | STRICTA item Adherence                       | Adherence ranged from 13% to 96%   | For some items                           |
| 102  | Health Sciences | 6 (62)                        | CONSORT Flow Diagram                         | 20 (32)  | No                                       |
|      |                 |                               | Trial Registration                           | 3 (5)  | No                                       |
| 104  | Health Sciences | 51 (NR)                       | Trial Registration                           | 20 (39%) of journals had articles that did not mention trial registration    | No                                       |

Acronyms: CONSORT - The Consolidated Standards of Reporting Trials Statement, CONSORT-NPT – CONSORT extension for Non-Pharmacological Trials, RCTs – Randomized Controlled Trials, STRICTA - Standards for Reporting Interventions in Clinical Trials of Acupuncture.

## Section 2. Series of Meta Analyses

For each topic we meta-analysed, we first present overall findings and possible differences between different disciplines, and then effects found only in studies that analysed *Health Sciences* journals, as most studies of Instruction to Authors (ItAs) were conducted on *Health Sciences* journals. In order to preserve the same reference order as in the paper, references<sup>1-20</sup> represent those used in the introduction and methods, while references<sup>21-173</sup> refer to the 153 studies that were included in our systematic review and meta-analyses. As time trends were estimated using regression models, related reported percentages may somewhat differ from the percentages reported in individual studies. All data is available at: [10.17632/53cswwpdn.4](https://doi.org/10.17632/53cswwpdn.4).

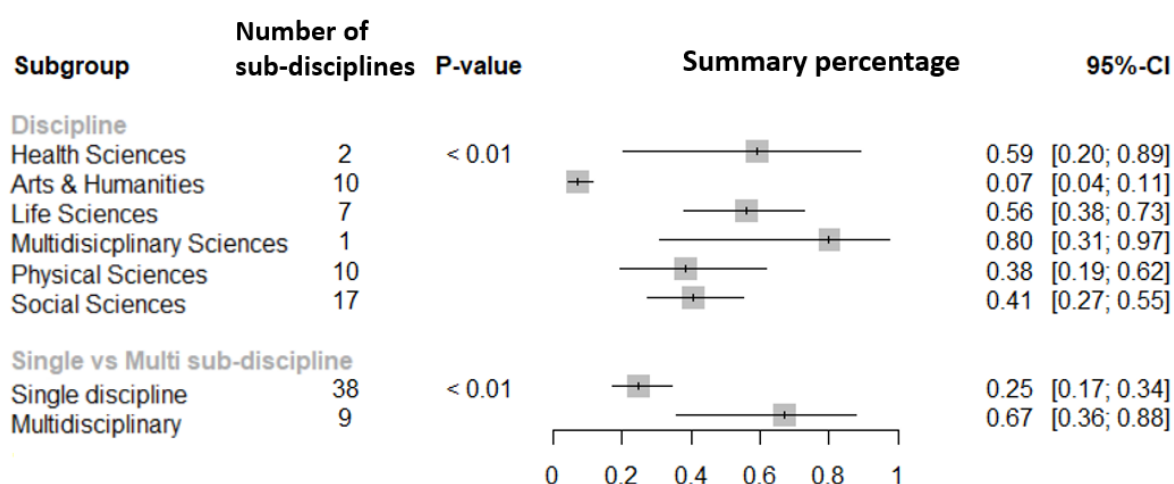
### Results Per Topic

#### Authorship

Twenty-six publications analysed if authorship was addressed in ItAs<sup>28, 40, 54, 57, 75, 76, 81, 82, 88, 91, 97, 98, 109, 112, 119, 121, 123, 124, 134, 137, 143, 144, 147, 149, 165, 166</sup>. These studies reported 121 authorship percentages (AP, defined as a number of journals whose ItAs addressed authorship divided by a total number of journals analysed in a study). Of these, almost half APs (n=51, 42%) were reported in one study which analysed journals published in 2010 and listed in *Science Citation Index* (SCI), *Social Science Citation Index* (SSCI), and *Arts & Humanities Citation Index* (A&HCI) categories. Specifically, the study analysed: a) top five journals assigned to several sub-disciplines of SCI and SSCI, and b) a random third of journals assigned to selected sub-disciplines of A&HCI.<sup>98</sup> Meta-analysis of these APs showed considerable heterogeneity between disciplines ( $I^2=94\%$ ;  $Q\text{-value}=84.6$ ,  $df=5$ ,  $p<0.001$ ; Supplementary Figure 1), as well as a great variability between sub-disciplines (i.e. in *Physical Sciences* discipline all five top journals belonging to the category *Materials Science, multidisciplinary* addressed the topic of authorship, while none did so in *Statistics & Probability*, or



*Telecommunications* sub-disciplines). Overall, authorship was more often addressed in *Multidisciplinary Sciences*, *Health Sciences* and *Life Sciences* journals, than in *Social Sciences*, *Physical Sciences* or *Arts & Humanities* journals (subgroup analysis of APs by discipline). In addition, journals of multidisciplinary subdisciplines were significantly more likely to address authorship.



Supplementary Figure 1. Subgroup analyses for proportion of journals addressing authorship in their instructions to authors. Analyses are pooled by discipline, or single vs multidisciplinary nature of their subdiscipline category (subdisciplines were chosen from *Science Citation Index* (SCI), *Social Science Citation Index* (SSCI), and *Arts & Humanities Citation Index* (A&HCI) in 2010<sup>98</sup>). Shown are sub-disciplines' summary percentages with 95% CIs. Short vertical lines represent point estimate, horizontal lines represent 95% CIs and size of grey rectangle represent weight used in a meta-analysis model. Subgroups demonstrated large heterogeneity so no pooling of overall summary AP was performed.

Two studies by the same author compared different disciplines within a country, specifically of open access journals in Croatia, analysing almost the same set of journals, but applying different coding, data extraction methods, and journal classification.<sup>143, 144</sup> The first study compared *Health* and *non-Health* journals in 2014 and reported APs of 29% (95% CI 17-45%) vs 11% (95% CI 7-17%) demonstrating large heterogeneity of percentages ( $I^2=87\%$ ,  $Q$ -value=7.7,  $df=1$ ,  $p=0.005$ ),<sup>143</sup> while the second study compared *Health Sciences*, *Natural Sciences*, *Technical Sciences*, *Bio-Technical Sciences*, *Social Sciences*, and *Arts & Humanities* in 2015, and displayed less heterogeneity ( $I^2=64\%$ ,  $Q$ -value=14.1,  $df=5$ ,  $p=0.015$ ), with

authorship more frequently addressed in *Health Sciences* journals (AP of 37%, 95% CI 22-55%) than in *Arts & Humanities*, *Social Sciences*, or *Technical Sciences* (APs of *Health Sciences* were 8 to 29% higher,  $p \leq 0.045$ ). In addition to discipline and country-specific APs, these two studies and one additional study,<sup>134</sup> also reported aggregate (i.e. cross-discipline) APs for Croatia, which showed steady, but not statistically significant increase in APs per year (9% in 2013, 14% in 2014, and 18% in 2015;  $p \geq 0.073$  for difference between 2013 and 2014, and  $P=0.269$  for difference between 2014 and 2015).

APs of *Social Sciences* journals were reported in 3 studies (Croatia in 2013,<sup>124</sup> and 2015,<sup>144</sup> and Spain and Latin-America in 2015<sup>149</sup>) and demonstrated significant differences between countries (subgroup analysis,  $Q\text{-value}=11.9$ ,  $df=2$ ,  $p=0.001$ ) with the Croatian summary AP estimate being significantly lower (10% vs 25%, AP difference of 15%, 95% CI 6-25%).

#### *Authorship in Health Sciences journals*

Twenty-one studies reported APs in *Health Sciences* journals<sup>28, 40, 57, 75, 76, 81, 82, 88, 91, 97, 98, 112, 119, 121, 123, 137, 143, 144, 147, 165, 166</sup>. However, they differed greatly in analysed databases and journal selection methods and were highly heterogeneous ( $I^2=84\%$ ,  $Q\text{-value}=25.0$ ,  $df=4$ ,  $p<0.001$ ) and. Therefore, we explored the sources of heterogeneity based on available data, and found that time and (database) indexation affected the likelihood of addressing authorship in *Health Sciences* journals (Supplementary Figure 2). Namely, top journals or journals index in *Abridged Index Medicus* (AIM), between 1995 (AP 46%) and 2010 (AP 86%) demonstrated a 3% annual increase (14% annual odds increase,  $p$  for meta-regression coefficient,  $P_{M-RC}=0.035$ , and  $\text{pseudo-}R^2=68\%$ ; however  $\text{pseudo-}R^2$  dropped to 0% when journals indexed in Index Medicus, IM, were included in the model). Additionally, one study reported on the difference

between WAME member journals (70%) and non-member journals (40%) in 2016 (AP difference, 30%, 95% CI 17-42%).<sup>57</sup>

Country/region specific APs were reported in 10 studies,<sup>76, 82, 97, 112, 119, 143, 144, 147, 165, 166</sup> and demonstrated statistically significant differences (subgroup analysis by countries, Q-value=112.6, df=7, p<0.001, Supplementary Figure 2). Majority of country/region specific APs were lower than 50%, with the exception of China which reported the highest AP (86%), India (summary AP of 65%, (95% CI 58-71%; heterogeneity  $I^2=2\%$ , Q-value=2.0, df=2, p=0.362), and South East Europe region (64%). In Iran, statistically significant differences were reported for journals published in different languages (AP difference of 19% of English vs Farsi, 95% CI 8-30%).<sup>112</sup> (Note: The specific AP rates of *Health Sciences* journals are a good model to depict the sensitivity of APs to various factors. Alongside the above differences between countries and publication language of a journal, in two studies from Croatia<sup>143, 144</sup> and India<sup>165, 166</sup>, where researchers assessed a largely overlapping set of journals just one year apart, we observed a non-significant increase in AP of 8% in Croatia, and 12% decrease in India. This indicates possible influences of journal selection and analytic methods.) Additionally, the study in China in 2014 reported no statistically significant differences between Chinese Medical Association Publishing House (CMPAH) Health Sciences journals and non-CMPAH journals (summary AP 85%, 95% CI 80-89%).<sup>147</sup>

## Global AR rates

1995<sup>75</sup>  
1998<sup>40</sup>  
2005<sup>75</sup>  
2006<sup>57</sup>  
2010<sup>88</sup>

## Country/region

India, 2010<sup>97</sup>  
India, 2014<sup>165</sup>  
India, 2015<sup>166</sup>

Croatia, 2014<sup>143</sup>  
Croatia, 2015<sup>144</sup>

China, 2014<sup>147</sup>

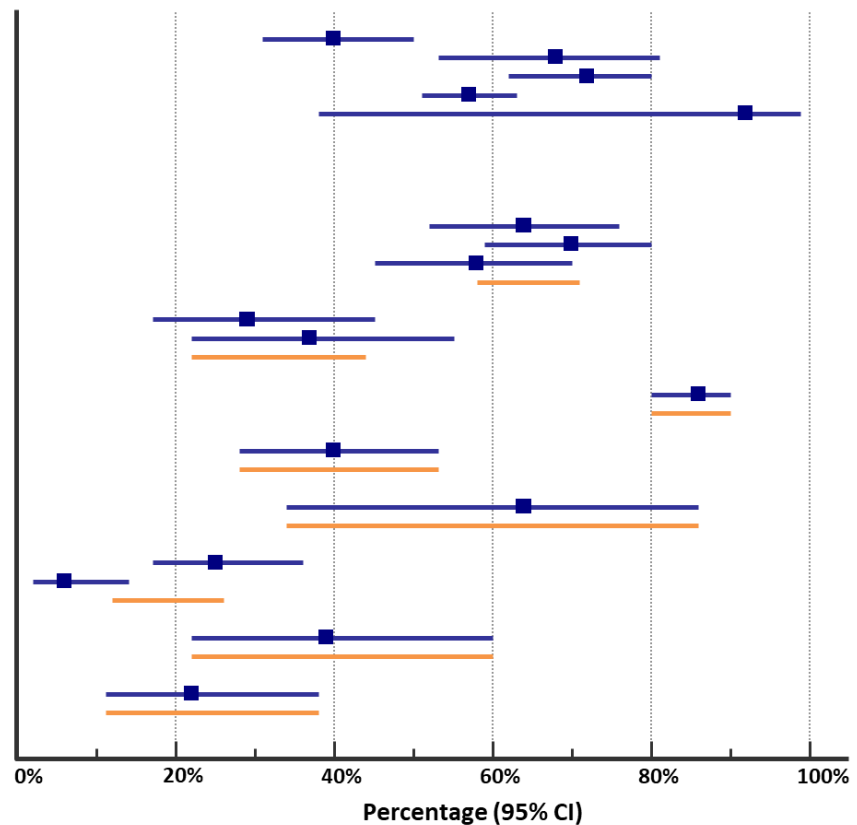
Eastern EU, 2012<sup>119</sup>

South-East EU, 2012<sup>119</sup>

Iran, 2012 English<sup>112</sup>  
Iran, 2012 Farsi<sup>112</sup>

Spain, 2010<sup>82</sup>

Pakistan, 2009<sup>76</sup>



Supplementary Figure 2. Instructions to authors of *Health Sciences* journals addressing authorship based on journal indexation in international databases (global rates) or per country/region. Authorship reporting percentages (ARs) with 95% CI are shown in blue, while summary effects (per country) are shown in orange. Blue rectangles represent point estimates of percentages that were reported in primary studies, with size of a rectangle representing weight used in a meta-analysis model. Blue lines around rectangles represent 95% CIs of these point estimates. Orange lines correspond to 95% CI for country-specific summary effects. For global AR rates where meta-regression identified significant effect of time, the data were not pooled together. For similar reason, we did not pooled together data from different countries. References are shown as superscript numbers.

Finally, seven studies reported 12 APs of various *Health Sciences* subdisciplines (e.g. *Anaesthesiology, General Medicine, Plastic Surgery, Pharmacy, etc.*)<sup>28, 81, 91, 98, 121, 123, 137</sup> They demonstrated moderate heterogeneity ( $I^2=43\%$ ,  $Q\text{-value}=19.1$ ,  $df=11$ ,  $p=0.059$ ) with the summary AP of 52% (95% CI 41-63%). No time trend was detected for a period of 1995 to 2015 (meta-regression,  $P_{M-RC}=0.219$ ).

One of these studies, in 2013, showed no significant differences between MEDLINE indexed Health Sciences pharmacy journals and non-indexed journals (summary AP 52%, 95% CI 35-69%), nor between PMC indexed and non-indexed journals (summary AP 52%, 95% CI 35-68%), nor between ICMJE endorsing and non-endorsing journals (summary AP 51%, 95% CI 34-68%). (Note: As can be seen from the wide range of CIs, the study was slightly underpowered due to study groups consisting of 11 to 22 journals).<sup>121</sup>

### *Association between citation metrics and addressing of authorship in Health Sciences journals*

Two studies reported APs for journals grouped according to their impact factor (IF). One analysed journals from plastic surgery, oral-craniofacial/facial plastic surgery, and otorhinolaryngology/head and neck surgery in *Journal Citation Reports* (JCR).<sup>81</sup> Reanalysis of this data showed that journals with IF values 1-2 exhibited significantly higher APs than those with IF<1 (AP difference of 35%, 95% CI 4-57%, p=0.024), but there was no statistically significant difference regarding the top IF>2 category (p=0.276) possibly due to small number of journals (n=6) in that category. The other study analysed nine general medicine journals with only three journals per each category (<1, 1-2.2, >2.2).<sup>91</sup> It showed stable, time invariant differences, from 2000 to 2010 between journals with IF <1 and >2.2 (0 out of 3 journals for IF<1 and 3 out of 3 journals for IF>2.2 throughout the years, with no changes for IF 1-2.2 category (2 out of 3 journals in 2000, 2005 and 2010)).<sup>91</sup> One additional study (which did not report data in a way that would allow for meta-analysis) reported no association between IF of the journal and the addressing of authorship.<sup>165</sup>

### Conflicts of interest

Thirty-six publications analysed if conflicts of interest (COI) were addressed in ItAs.<sup>22,</sup>

28, 31, 34, 36, 40, 54, 55, 70, 72, 75, 77, 80, 81, 88, 90, 91, 99, 103, 109, 112, 114, 115, 119, 121, 137-140, 143-145, 147, 149, 151, 165

These studies reported 112 COI percentages (CPs, defined as a number of journals whose ItAs addressed conflicts of interest divided by a total number of journals analysed in a study). Only three studies, however, reported CPs across disciplines. The first one, in 1996, analysed top 1396 journals ranked by IF or the number of times journals were cited, and reported a CP of 16% (95% CI 14-18%).<sup>34</sup> The second, in 1998, analysed 41 journals (mostly *Multidisciplinary, Health, and Life Sciences* journals which had previously published retractions or corrections due to misconduct cases), and reported a CP of 41% (95% CI 28-57%).<sup>40</sup> Finally, the third study, analysed top five *Health and Life Sciences* journals in 2010, and reported a CP of 100% (95% CI 38-100%).<sup>88</sup> We observed a rise in CPs with time, with the increase of 26% (95% CI 12-41%) between 1997 and 1998, and of 59% (95% CI 13-72%) between 1998 and 2010 (Note: this observation may be influenced by the fact that the latter two studies had much smaller sample sizes than the first, 41 and 5, vs 1396 of the first study, and they had a higher prevalence of health journals, which we show below have much higher percentages of CPs).

Two studies by the same author of open access journals in Croatia compared differences between disciplines, but had slight differences in journal selection and text analysis.<sup>143, 144</sup> The first study in 2014 compared *Health* and *non-Health* journals and reported CPs of 32% (95% CI 19-48%) vs 4% (95% CI 2-8%) demonstrating large heterogeneity between the groups ( $I^2=95\%$ ,  $Q\text{-value}=20.6$ ,  $df=1$ ,  $p<0.001$ ),<sup>143</sup> while the second study in 2015 compared *Biomedical, Natural, Technical, Bio-Technical, Social Sciences, and Humanities*, and also showed considerable heterogeneity ( $I^2=77\%$ ,  $Q\text{-value}=21.8$ ,  $df=5$ ,  $P=0.001$ ) with *Humanities* having the lowest CP of 7%, 95% CI 4-15% ( $p\leq 0.009$  for all comparisons except with *Bio-Technical Sciences*).<sup>144</sup> The highest CP of 43% (95% CI 27-61%) was observed for *Biomedical Sciences* ( $p\leq 0.045$  for comparisons with *Technical, Social Sciences or Humanities*). The yearly increase in country's overall, cross-discipline CPs was considerable, from 9% (95% CI 6-14%) in 2014 to 21% (95% CI 17-26%) in 2015 (mean difference 12%, 95% CI 19-33%). (Note: the

difference in analytic methods and sampling between these two studies might had an effect on this significant increase in CPs).

One additional study reported a country's overall, cross-discipline CPs. That of 9 journals from Cameroon in 2009 with reported CP of 22% (95% CI 6-58%).<sup>72</sup> Subgroup analysis showed a non-significant difference between Cameroon and Croatia (Q-value=0.3, df=1, p=0.562). (Note: the lack of effect is likely due to the small number of Cameroonian journals analysed).

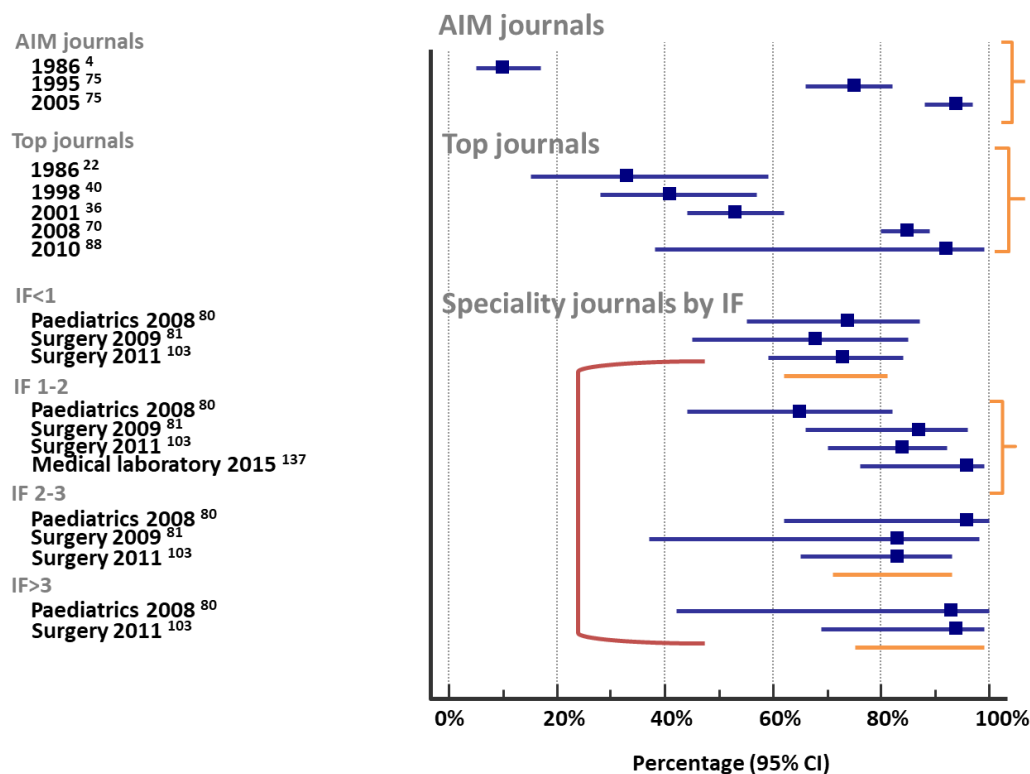
Finally, one study analysed Spanish and Latin American *Social Sciences* journals in 2015, and reported a CP of 25% (95% CI 18-34%).<sup>149</sup> Subgroup analysis also showed a non-significant difference of -1% when compared with *Croatian Social Sciences* journals in 2015 (CP of 24%, 95% CI 16-34%).

### *Conflicts of interest in Health Sciences Journals*

Thirty-three publications reported CPs in *Health Sciences* journals.<sup>22, 28, 31, 36, 40, 54, 55, 70, 75, 77, 80, 81, 88, 90, 91, 99, 103, 109, 112, 114, 115, 119, 121, 137-140, 143-145, 147, 151, 165</sup> The CPs of core *Health Sciences* journals indexed in AIM, analysed in two studies at three time points,<sup>22, 75</sup> changed from 10% (95% CI 5-17%) in 1986, to 94% (95% CI 88-97%) in 2005 (Supplementary Figure 3; the time trend was confirmed by non-overlapping 95% CIs). Similarly, top *Health Sciences* journals, analysed in the period between 1986 (CP 21%) and 2010 (CP 83%) in five studies (3 studies of exclusively *Health Sciences* journals,<sup>22, 36, 70</sup> and 2 that included some *Life* or *Multidisciplinary* journals<sup>40, 88</sup>) also showed steady increase in CP with time (a 13% annual increase in odds of addressing COI;  $p_{M-RC}$  on time of 0.002; pseudo- $R^2$  of 76%, Supplementary Figure 3). Moreover, CPs of top journals across disciplines in the period 1997-1998 (16% and 41%, respectively),<sup>34, 40</sup> were lower than those of *Health Sciences* journals published at the

closest time periods (1995 and 2001), which even then already reached CPs of 53% and 75%.<sup>36</sup>

75



Supplementary Figure 3. Percentages of instructions to authors of *Health Sciences* journals addressing conflicts of interest. Journals are grouped into those listed in Abridged Index Medicus (AIM) database, classified as top Biomedical journals, or Specialty journals grouped by impact factor (IF) categories: IF<1, IF1-2, IF2-3, IF>3. Percentages with 95% CIs are shown in blue, with the blue rectangles representing point estimates that were reported in a study and size of rectangles representing weights used in a meta-analysis model. Summary effects including 95% CIs are shown in orange. For groups of studies where we found significant effect of time, marked with orange brackets, we did not pool the data. Significant difference in percentages between IF categories is marked with a red bracket. References are shown as superscript numbers.

Ten studies reported 49 CPs for *Health sub-disciplinary* journals,<sup>28, 80, 81, 90, 91, 103, 121, 137-139</sup> of which only 12 CPs belonging to 4 studies addressed the same subdiscipline two or more times (Supplementary Figure 3). Since the initial heterogeneity of CRs of *Health sub-disciplinary* journals was substantial ( $I^2=68\%$ ,  $Q\text{-value}=33.9$ ,  $df=11$ ,  $p<0.001$ ) we performed a



subgroup analysis which demonstrated that pharmacy journals published in 2013 had significantly lower CPs (42%, 95% CI 27-60%) compared to summary CPs of clinical specialities between 1995 and 2015 (79%, 95% CI 75-85%) or general medicine between 2000 and 2010 (74%, 54%-87%) journals (subgroup analysis, Q-value=16.3, df=2, p<0.001). Still, the heterogeneity within the clinical speciality group was moderate to large ( $I^2=52\%$ , Q-value=14.5, df=7, p=0.043). One study,<sup>90</sup> which sampled clinical speciality journals from the DOAJ database while most others sampled from the JCR sub-disciplines, increased this heterogeneity by  $\Delta I^2=30\%$  and its CP estimate of 63% (95% CI 48-77%) was significantly lower from that of the same sub-disciplines of journals sampled using JCR one year earlier (78%, 95% CI 67-86%; difference in rates of 15%, 95% CI -2% to 31%, significance at 0.1 level, p=0.091). We therefore, excluded it from pooling of the results. Summary CPs of clinical speciality journals from the remaining 7 studies demonstrated a CP increase with time, with the annual increase in odds of addressing COI of 9% ( $p_{M-RC}$  on time of 0.022, pseudo- $R^2=100\%$ ) with CP from 64% in 1995 to that of a maximum of 96% (95% CI 76-99%) in 2015.

The study that was excluded, also reported significant differences for three groups of journal publishers (open access publishing houses, other, and professional organisation publishers, subgroup analysis Q=5.5, df=2, p=0.065, significant at 0.1 level).<sup>90</sup>

One of the included studies, in 2013, showed no statistically significant differences between MEDLINE indexed Health Sciences pharmacy journals and non-indexed journals (summary CP 43%, 95% CI 27-60%), nor between PMC indexed and non-indexed journals (summary CP 43%, 95% CI 27-60%), nor between ICMJE endorsing and non-endorsing journals (summary CP 43%, 95% CI 27-60%). (Note: As can be seen from the wide range of CIs, the study was slightly underpowered due to study groups consisting of 11 to 22 journals).<sup>121</sup>

Eleven country specific CPs for *Health Sciences* journals were reported in 10 studies,<sup>31, 77, 112, 114, 115, 119, 143, 144, 147, 165</sup> and showed large heterogeneity ( $I^2=94\%$ , Q-value=154.6, df=10,

$p < 0.001$ ). In India a significant increase in CPs was reported between 2008 and 2014 (from 30% to 89%, mean increase of 59%, 95% CI 44-70%). We also observed increases in CPs in Brazil between 2007 and 2012 (from 55% to 73%, CP increase of 18%, 95% CI from -6% to 41%), and in Croatia between 2014 and 2015 (from 32% to 43%, CP increase 12%, 95% CI -11% to 33%). (Note: absence of statistically significant differences in Croatia and Brazil could stem from high uncertainty of these estimates).

Additionally, national Iranian journals published in 2012 displayed significant differences between journals published in English (79%) and Farsi (31%) with CP difference of 48% in, 95% CI 33-60% respectively).<sup>112</sup> No difference was found in 1995 between ICMJE endorsing Mexican Health Sciences journals (CP 9%, 95% CI 3-24%) and non-endorsing journals (CP 4%, 95% CI 1-18%).<sup>31</sup> Finally, for China in 2014, there were significant differences between Chinese Medical Association Publishing House (CMPAH) Health Sciences journals (CP 34% 95% CI 24-46%) and non-CMPAH journals (CP 6% 95% CI 3-10%).<sup>147</sup>

(Note: as both the sub-discipline and country effects were demonstrated in the paragraphs above, 6 studies that reported country specific sub-discipline percentages were not included in pooled analyses<sup>54, 55, 109, 140, 145, 151</sup>).

### *Association of citation metrics and addressing of conflicts of interest in Health Sciences journals*

Seven studies reported CPs for different IF subsets of *Health Sciences* journals.<sup>80, 81, 91, 99, 103, 114, 137</sup> The effect of IF across all *Health* subdisciplines CPs was, however, analysed only in one study which compared two datasets of top *Health* journals published in 2009: those with

IF $\geq$ 10 and journals with IF<10 presenting with very high median IF of 4.7; and reported a 100% CP for both categories (summary CP of 98%, 95% CI 89-100%).<sup>99</sup>

In Brazil, an effect of the IF was evident in ItAs published in 2012, as journals with IF exhibited 38% higher CP (95% CI 12-58%) than those without IF (92% vs 54%, respectively,  $p=0.004$ ).<sup>114</sup>

Five studies reported *Health sub-disciplinary* journals CPs (Supplementary Figure 3).<sup>80, 81, 91, 103, 137</sup> Of these, the CPs reported in one study were based on a sample of 3 journals per IF category so we excluded it from the integrated analysis.<sup>91</sup> This study, which analysed journals in the period from 2000 to 2010, demonstrated time invariant CPs in the middle (IF 1-2.2) and upper (IF >2.2) categories (3 out of 3 journals in highest, and 2 out of 3 in middle category addressing COI), whereas in the lowest category (IF <1) one journal addressed COI in 2000, and two in 2005 and 2010. Remaining studies analysed ItAs between 2008 and 2015 and grouped journals within approximately the same IF categories: IF<1, 1-2, 2-3, >3, and showed low heterogeneity ( $I^2=26\%$ ,  $Q\text{-value}=14.9$ ,  $df=11$ ,  $P=0.187$ ). Nevertheless, meta-regression still revealed steady increase of CP with the increasing category of IF, with a significant increase observed only between the lowest (IF<1, CP of 72%) and the highest (IF>3, CP of 85%) category (increase of 5.9 times in odds of addressing COI;  $p_{M-RC}$  IF>3 vs IF<1=0.046; pseudo- $R^2=74\%$ ).

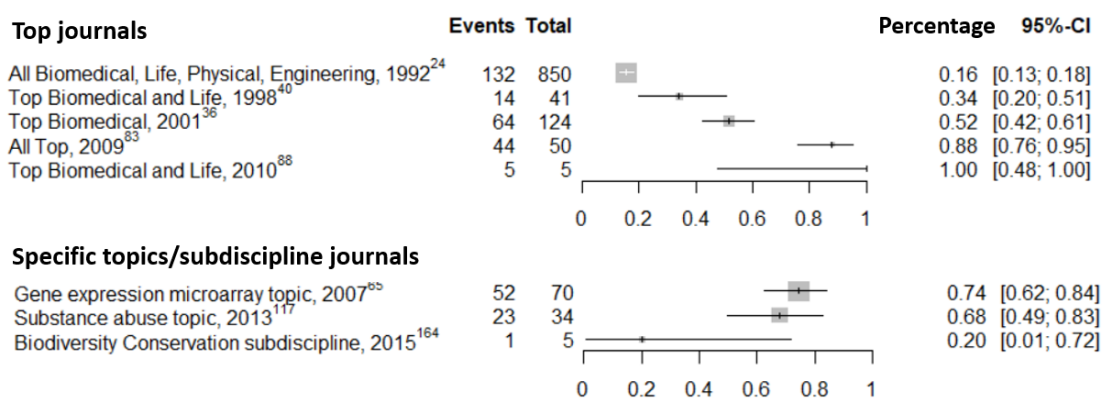
One additional study (which did not report data in a way that allowed for meta-analysis) reported no association between IF of the journal and the addressing of conflicts of interest.<sup>165</sup>

## Data Sharing

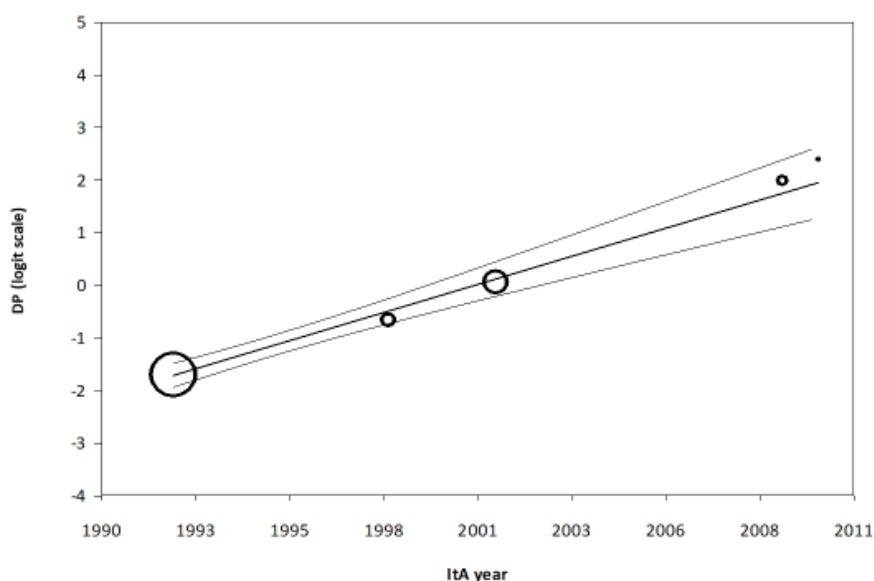
Ten publications analysed if data sharing was addressed in ItAs and reported 22 data sharing percentages (DPs, defined as a number of journals whose ItAs addressed data sharing

divided by a total number of journals analysed in a study).<sup>24, 36, 40, 65, 83, 88, 117, 143, 144, 164</sup> Five studies which covered a time span of 1992-2010 reported on DPs of predominantly top journals across disciplines.<sup>24, 36, 40, 83, 88</sup> While the heterogeneity of these percentages was considerable ( $I^2=97\%$ ,  $Q\text{-value}=138.8$ ,  $df=4$ ,  $p<0.001$ ), time almost entirely explained the observed between-study variability of DPs. Namely, an annual increase in odds of addressing data sharing was 23% ( $p_{M-RC} <0.001$ ,  $\text{pseudo-}R^2=100\%$ ; Supplementary Figures 4A and 4B) with the DP of 15% in 1992 to 88% in 2010.<sup>88</sup>

The time effect, however, was not observed for subdiscipline journals from different disciplines (molecular biology and biochemistry,<sup>65</sup> substance abuse,<sup>117</sup> biodiversity conservation<sup>164</sup>) which displayed substantial heterogeneity ( $I^2=57\%$ ,  $Q\text{-value}=4.7$ ,  $df=2$ ,  $p=0.096$ ) with DPs ranging from 20 to 74% (Supplementary Figure 4A). Additionally, one of these studies, (which did not report data in a way that would allow for meta-analysis) also reported increased odds for the existence of a journal's data sharing policy for gene expression microarray data in higher impact factor journals, and open access journals, with a decrease in odds for Oncology journals.<sup>65</sup>



A



B

Supplementary Figure 4. Percentages of instructions to authors of journals addressing data sharing. A - Percentages of journals addressing data sharing in their instructions to authors, shown by category of journals and ordered by time. Percentages with 95% CIs are shown in blue, with the blue rectangle representing point estimate that was reported in a study and size of the rectangle representing weight used in a meta-analysis model. As we found significant effect of time and unexplained heterogeneity, we did not pool the data. References are shown as superscript numbers. B - Regression line illustrating how data sharing percentages (DP) have changed over time for top journals. Regression line is represented with full line, whereas 95% CI lines are shown in grey. Point estimates of the percentages that were reported in individual studies are shown as circles, with size of a circle representing weight used in a meta-regression model.

Two studies by the same authors compared differences between disciplines, specifically of open access journals in Croatia, analysing almost the same set of journals, but applying a different coding and extraction methods, and journal classification.<sup>143, 144</sup> The first study compared *Health* and *non-Health* journals in 2014 and reported DPs of 24% (95% CI 13-40%) vs 6% (95% CI 3-11%) demonstrating large heterogeneity of DPs ( $I^2=90\%$ ,  $Q\text{-value}=10.3$ ,  $df=1$ ,  $p<0.001$ ),<sup>144</sup> while the *second* study compared *Biomedical*, *Natural*, *Technical*, *Bio-Technical*, *Social Sciences*, and *Humanities* in 2015, and also showed considerable heterogeneity ( $I^2=84\%$ ,  $Q\text{-value}=32.0$ ,  $df=5$ ,  $p<0.001$ ),<sup>143</sup> with *Biotechnical* (DP of 77%) and *Natural Sciences* (DP of 62%) having the highest, and *Humanities* the lowest DPs (DP of 19%,

$p \leq 0.045$  for comparison with other disciplines). The yearly increase in overall country's DPs was considerable, from 9% in 2014 to 36% in 2015 (mean difference 27%, 95% CI 19-33%).

#### *Association between citation metrics and addressing of data sharing in journals*

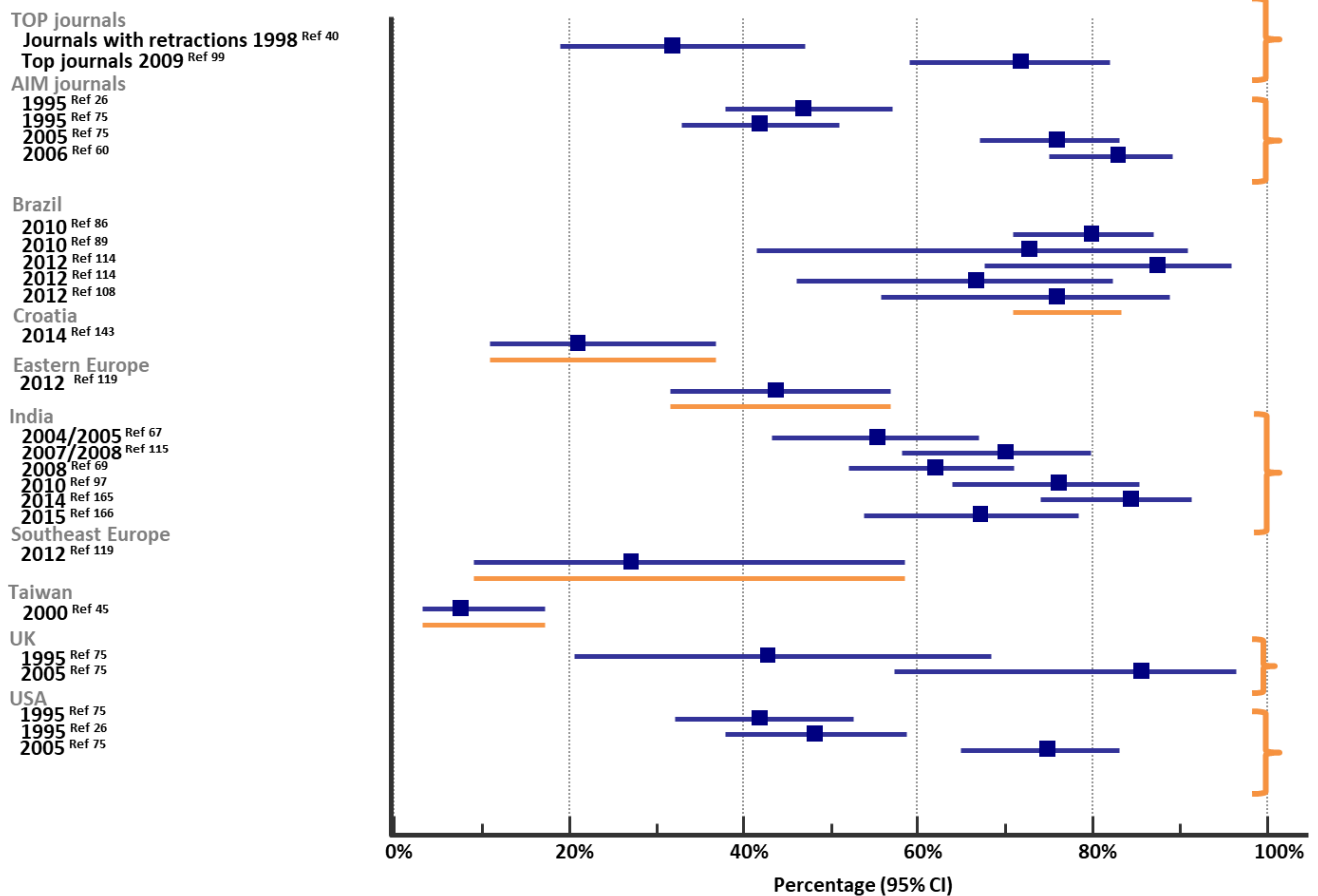
Only one study investigating journals publishing papers on substance abuse reported DPs for different IF quartiles,<sup>117</sup> with one step increase in quartile category increasing the odds of addressing data sharing by 127%, corresponding to 22% percent increase in DP per quartile ( $p_{M-RC}=0.035$ , pseudo- $R^2=100\%$ ). The top quartile had significantly higher DP than the lowest one (89% vs 38%, mean difference 51%, 95% CI 6-77%). Two additional studies (which did not report data in a way that would allow for meta-analysis) indicated that a stronger data policy was associated with higher impact factor values.<sup>65, 83</sup>

## Ethics approval

Thirty-one publications analysed if requiring ethics or institutional review board approval (IRB) was addressed in ItAs, and reported 123 ethics approval percentages (EPs, defined as a number of journals whose ItAs addressed ethics approval divided by a total number of journals analysed in a study).<sup>26, 27, 30, 40, 45, 58, 60, 67, 69, 72, 74, 75, 77, 86, 89, 91-93, 97, 99, 108, 114, 115, 119, 137, 143, 145, 149, 151, 165, 166</sup> Only three studies reported EPs not exclusively based on *Health Sciences* journals. Two studies reported country-specific EPs across disciplines: a study of Cameroonian journals in 2009 which showed an EP of 22% (95% CI 6-58%),<sup>72</sup> and a study of Croatian open access journals in 2014, which reported EP 8% (95% CI 5-13%).<sup>143</sup> No significant difference was found between the countries, likely due to high uncertainty of the Cameroon estimate. Finally, the study of Spanish and Latin-American journals indexed in JCR Social Sciences in 2014 reported a EP of 13% (95% CI of 8-21%).<sup>149</sup> The Croatian study additionally compared *non-Health Sciences* (EP of 5%, 95% CI 3-10%) with that of *Health Sciences* (21%, 95% CI 11-37%) and found *non-Health* EP to be significantly lower.

### *Ethics approval in Health Sciences Journals*

Five studies reported 6 EPs of predominantly *Health Sciences* journals,<sup>26, 40, 60, 75, 99</sup> demonstrating very high heterogeneity ( $I^2=92\%$ ,  $Q\text{-value}=66.2$ ,  $df=5$ ,  $p<0.001$ ), with EPs of top journals<sup>40, 99</sup> being lower than those indexed in AIM<sup>26, 60, 75</sup> published four to five years earlier and with both categories of journals showing increase in EP with time (Supplementary Figure 5). We, therefore, performed meta-regression using time and journal categories (AIM or top) as covariates and found that both significantly affected EPs ( $p_{M-RC}$  for both  $\leq 0.0002$ , pseudo- $R^2=100\%$ ). Annual increase in odds of addressing EP was 16%; whereas AIMS indexation increased the odds by 164% relative to top journals.



Supplementary Figure 5. Percentage of instructions to authors mentioning ethics approval in *Health Sciences* journals. Percentages with 95% CIs are shown in blue, with the blue rectangle representing point estimate that was reported in a study and size of the rectangle representing weight used in a meta-analysis model. Summary effects including 95% CIs are shown in orange. For groups of studies where we found significant effect of time, marked with orange brackets, we did not pool the data. References are shown as superscript numbers.

After excluding EPs calculated on sample sizes of  $\leq 3$  journals, seven studies remained which reported EPs in *Health Sciences* subdisciplines between 1995 and 2015.<sup>26, 58, 74, 75, 91, 93, 137</sup> These studies showed moderate heterogeneity ( $I^2=47\%$ ,  $Q\text{-value}=45.5$ ,  $df=24$ ,  $p=0.005$ ), which was partly due to low precision of estimates, as more than half of reported EPs (13 out of 25, 52%) were derived from analyses based on ten or fewer journals. Nevertheless, we found that both time and subdiscipline affected EPs (meta-regression using time and sub-discipline as covariates,  $\text{pseudo-}R^2=100\%$ ). On average, the odds of addressing ethics approval in subdiscipline journals increased each year by 13% ( $p_{\text{M-RC}}$  of time  $<0.001$ ) which corresponds



to 3% annual percent increase. Further, compared to *Dentistry* journals as the reference category, *Internal Medicine* or *Surgery* increased the odds of addressing ethics approval in ItA by 9-12 times, which corresponded to 34-36% increase in EP ( $p_{M-RC}$  on speciality  $<0.001$  for both). For AIM indexed subdisciplines: *Medicine*, *Miscellaneous*, *Paediatrics*, *Medical Laboratory Technology*, *Pathology*, and *Mixed* these odds were increased from 3.3 to 6.6 times ( $p_{M-RC} \leq 0.079$ ); while *Nursing*, *Multidisciplinary* increased it by 2.1 times ( $p_{M-RC} = 0.031$ ). No statistically significant difference in odds compared to dentistry journals was found for *General Medicine*, and *Oral and Maxillofacial Surgery* subdisciplines.

Eighteen studies reported country or region specific EPs for *Health Sciences* journals,<sup>26, 27, 45, 67, 69, 75, 77, 86, 89, 97, 108, 114, 115, 119, 143, 165, 166</sup> and showed substantial heterogeneity between the countries/regions (subgroup analysis by countries,  $Q\text{-value}=119.7$ ,  $df=8$ ,  $p<0.001$ , Supplementary Figure 5). Nevertheless, in all the countries in which EPs were measured at two or more time points we observed an increase in EP with time. In India, the annual increase in odds of addressing ethics approval in ItAs between 2004/5 and 2015 was 5% (significant at 0.1 level,  $p_{M-RC}$  on time of 0.061,  $\text{pseudo-}R^2=47\%$ ), while in Brazil between 2007 and 2012, the increase in odds was 22% (significant at 0.1 level,  $p_{M-RC}$  on time of 0.074,  $\text{pseudo-}R^2=74\%$ ). In the UK, EPs increased by 43% (95% CI 7-67%,  $p=0.017$ ) within a ten year period, while in the USA, in the same time period, EP increased by 27% (95% CI 12-40%,  $p<0.001$ ) when comparing to the 1995 estimate reported by Amdur and Biddle,<sup>26</sup> or 33% (19-46%,  $p<0.001$ ) when compared to a 1995 estimate reported by Rowan-Legg et al.<sup>75</sup> The study on Korean journals also reported percentages for subgroups of Medical Association member journals (EP 2%, 95% CI 0.3-10%) and quasi member journals (EP 5%, 95% CI 1-16%).<sup>27</sup>

One study on Indian journals in 2005 reported percentages for ICMJE endorsing Health Sciences journals (EP 79%, 95% CI 60-91%) and non-endorsing journals (EP 41%, 95% CI 28-57%), as well as Medline indexed Health Sciences journals and non-indexed journals (summary

EP 55%, 95% CI 43-67%).<sup>67</sup> Another study, by the same first author, looked at the almost the same journals in 2008 and reported percentages for ICMJE endorsing Health Sciences journals (EP 91%, 95% CI 71-97%) and non-endorsing journals (EP 61%, 95% CI 47-74%), as well as MEDLINE indexed Health Sciences journals and non-indexed journals (summary EP 70%, 95% CI 58-80%).<sup>115</sup>

(Note: as the sub-discipline, time and country effects were demonstrated in the paragraphs above, a study in India that reported on country specific sub-discipline percentages was not included in the pooled analyses.<sup>151</sup>)

#### *Association between citation metrics and addressing of ethics approval in journals*

Two studies reported EPs in relation to IF values of journals.<sup>91, 114</sup> Of these, the EPs in one study were based on a sample of 3 journals per IF category so we excluded it from summary analysis.<sup>91</sup> This study, which analysed journals in the period from 2000 to 2010, demonstrated time invariant EPs for the upper (IF >2.2, 3 out of 3 journals requiring ethics approval), and middle category (IF 1-2, 0 out of 3 journals requiring ethics approval), whereas in the lowest category (IF <1) one journal required ethics approval COI in 2000 and 2005, and two journals in 2010. The second study, analysed the effect of IF on EPs in Brazil in 2012, and showed that EPs of JCR indexed journals with IF outperformed journals without IF that were sampled from Webqualis website by 21% (EPs of 88% vs 67%, 95% CI for difference from -3% to 42%, p=0.089 – significant at 0.1 level).<sup>114</sup> Four studies (which did not report data in a way that would allow for meta-analysis) reported on associations between IF and ethics approval, one demonstrating that higher impact factors journals were more likely to require ethics approvals,<sup>75</sup> while three others found no statistically significant associations with IF.<sup>99, 137, 165</sup>

## Funding disclosure

Eleven publications analysed if funding or grants was addressed in ItAs, and reported 35 funding percentages (FPs, defined as a number of journals whose ItAs addressed funding disclosure divided by a total number of journals analysed in a study).<sup>22, 23, 40, 54, 91, 115, 119, 138, 143, 149, 150</sup> Only two studies reported FPs not exclusively based on *Health Sciences* journals: a study of Croatian open access journals in 2014, which for *non-Health Sciences* journals reported an FP of 12% (95% CI 8-18%) compared to *Health Sciences* of 37% (95% CI 23-53),<sup>143</sup> and that of Spanish or Latin American journals indexed in JCR Social Sciences in 2014, with an FP of 6% (95% CI 3-12%).<sup>149</sup> Both of these FPs were lower than any other country or sub-discipline specific FPs of *Health Sciences journals* (described below) which ranged from 28-93% ( $p \leq 0.021$  for all comparisons).

### *Funding disclosure in Health Sciences journals*

Two studies, reported five FPs for (predominantly) *Health Sciences* journals.<sup>22, 40</sup> One study, demonstrated in 1986 that FPs of non-indexed or randomly selected IM journals showed increased odds for addressing funding 5.43 times were significantly lower than those of AIM indexed or that of top journals. Subsequently, relative to non-indexed or IM journals, top or AIMs journals showed increased odds for addressing URM 18.88 times, corresponding to an increase in UP of 24% ( $p_{M-RC} = 0.001$ , pseudo- $R^2 = 94\%$ , FPs of 3% and 1% vs 22% and 40% respectively,  $p \leq 0.043$ ). Taken together, the two studies did not display significant increase in FPs of top journals between 1986 and 1998 (top journals summary estimate of 47%, 95% CI 34-60%; heterogeneity  $I^2 = 0\%$ , Q-value=0.34, df=1,  $p = 0.560$ ), but did show that top journals were more likely to address funding in ItAs than AIM indexed journals which presented with

the estimated FP of 22%, 95% CI 15-31% (subgroup analysis by indexation, Q-value=10.1, df=1, p<0.001).

Three studies reported on country/region specific FPs,<sup>115, 119, 143</sup> with significant differences between them (subgroup analysis by region Q-value=23.1, df=3, p<0.001). The earliest reported FP of 70% (95% CI 58-80%), that of Indian journals in 2008, was also the highest (p≤0.028 for comparisons with other FPs), while those of Croatian open access journals in 2014, as well as those of Eastern and South-eastern European journals, in 2012, were comparable and ranged between 29-37%.

Three studies reported on FPs of *Health* sub-disciplinary journals<sup>91, 138, 150</sup> two of which estimated FPs on samples with fewer than ten journals, and were thus of low precision and heterogeneity (I<sup>2</sup>=0, Q-value=2.0, df=4, p=0.732). Nevertheless, for the period between 2000 and 2015, they showed uniformity with the summary FP of 81% (95% CI 74-87%). (Note: as effects of country and subdisciplines were demonstrated above, one study,<sup>54</sup> which reported country specific sub-discipline FP was not included in the summary analyses.)

#### *Association of citation metrics and disclosing of study funding in journals*

Only one study, which analysed journals in the period from 2000 to 2010, demonstrated time invariant FPs for the upper (IF >2.2) and middle (IF 1-2) categories (3 out of 3 journals in the upper, and 2 out of 3 journals in the middle category requiring funding support disclosure), whereas in the lowest category (IF <1) 3 journals required funding support disclosure in 2000 and 2005, but only one in 2010.

## Uniform Requirements for Manuscripts (URM)

Forty-five studies analysed if ItAs addressed any aspect of URM (known since 2013 as Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals, ICMJE Recommendations),<sup>174</sup> and reported a total of 141 URM percentages (UPs, defined as a number of journals whose ItAs addressed URM divided by a total number of journals analysed in a study).<sup>22, 23, 26, 27, 30, 36, 41, 43, 45, 50, 54, 58, 60, 61, 67, 73-77, 80, 82, 85, 86, 90, 101-103, 108, 111, 115, 120, 121, 124, 126, 131, 134, 149, 150, 157, 162, 163, 165, 166, 173</sup> Only four studies reported UPs of *non-Health Sciences* journals. Two of these analysed Croatian journals across all disciplines, and found country's UPs between 8% in 2008 (95% CI 3-8%) and 5% in 2013 (95% CI 5-13%).<sup>85,</sup>  
<sup>134</sup> Two other studies, reported UPs for *Social Sciences* journals published within a particular region: Croatia in 2013 (2%, 95% CI 0-7%),<sup>124</sup> and Spain and Latin America in 2015 (15%, 95% CI 10-24%),<sup>149</sup> demonstrating high heterogeneity of percentages ( $I^2=89\%$ ,  $Q\text{-value}=9$ ,  $df=1$ ,  $P=0.003$ ). Nevertheless, compared to UP of 61% for *Health Sciences* that were assessed on the comparable region and at comparable time - Latin America and Caribbean in 2012, *Social Sciences* UP from Spain and Latin America was significantly lower (difference of 45%, 95% CI 30-58%). Finally, one additional study, reported UPs of top 5 *Life* or *Health Sciences* journals from 4 different countries (Brazil, Mexico, Chile and Argentina) in 2013, and found no significant differences between them (UPs of 0-40%, subgroup analysis by country  $Q=2.1$ ,  $df=3$ ,  $p=0.558$ ).<sup>131</sup>

### *Uniform requirements for manuscripts in Health Sciences journals*

Six studies reported UPs for top *Health Sciences* journals indexed in JCR selected based on their IF values,<sup>36, 41, 43, 50, 61, 162</sup>. They showed that UPs significantly increased with time from 26% in 2001 to 76% in 2014 (meta-regression,  $p_{M-RC} < 0.001$ , pseudo- $R^2=83\%$ , annual increase

in odds of addressing URM of 19%). One additional study reported UP for 15 top medical journals indexed in JCR in 1986, which was already very high (53%, 95% CI 29-76%), and was not included in the meta-regression analysis due to: a) much more stringent IF criteria applied to this set of journals compared to other estimates that were determined on at least 8 times larger set of top journals, and b) the fact that its inclusion largely deteriorated the meta-regression model and reduced its pseudo-R<sup>2</sup> by 35%.<sup>22</sup> This estimate was of very low precision, but was still significantly higher than the value for 124 top journals selected from the JCR list by IF in 2001,<sup>36</sup> or that of 100 randomly selected IM indexed journals assessed in 1986 ( $p < 0.007$  for both).<sup>22</sup> Additionally, one study, reported significant differences between CONSORT endorsing journals (UP 72%, 95% CI 56-84%) and non-endorsing journals (UP 35%, 95% CI 28-44%).<sup>43</sup>

Journals indexed in the AIM database, analysed in 5 studies,<sup>22, 23, 26, 60, 75</sup> showed a significant decrease from 35% in 1986 to 5% in 2006, with the annual decrease in odds for addressing URM of 9% ( $p_{M-RC} < 0.001$ , pseudo-R<sup>2</sup>=100%).

Differences between journals indexed in different databases were available only in one study<sup>22</sup> which reported UPs in 1986 being 6% (95% CI 1-34%) for non-indexed *Health Sciences* journals, 11% (95% CI 6-21%) for randomly selected IM indexed journals, 37% (95% CI 28-47) for AIM indexed journals, and 53% (95% CI 29-76%) for the top 15 *Health Sciences journals*. Subsequently, relative to non-indexed or IM journals, top or AIMs journals showed increased odds for addressing URM 5.43 times, corresponding to an increase in UP of 29% ( $p_{M-RC} < 0.001$ , pseudo-R<sup>2</sup>=100%).

One study in 2011 showed no statistically significant differences between *Health Sciences* journals that endorsed ICMJE or Consolidated Standards of Reporting Trials (CONSORT) standards (summary UP 71%, 95% CI 67-74%);<sup>126</sup> and it was comparable to that of top journals ranked by IF in 2014 (77%, 95% CI 70-83%).<sup>162</sup>

Seven studies reported UPs for *Health* sub-disciplinary journals listed in IM, JCR or DOAJ databases.<sup>26, 80, 90, 101, 103, 150, 173</sup>. The UPs reported between 2008 and 2016, irrespective of the indexing database or time, were quite homogeneous with the pooled estimate of 60% (95% CI 56-64%, heterogeneity  $I^2=0$ ; Q-value=2.1, df=6, p=0.908). One study also reported significant differences for three groups of journal publishers in 2009 (open access publishing houses, other, and professional organisation publishers, summary UP of 65%, 95% CI 49-78%).<sup>90</sup> One additional study (which did not report data in a way that would allow for meta-analysis) also reported no association of medical association membership, publication language, and country of publication with Ups in 2010.<sup>101</sup>

Fourteen studies reported country or region-specific UPs.<sup>26, 27, 30, 45, 67, 76, 77, 82, 86, 102, 111, 115, 165, 166</sup> These studies showed great heterogeneity (Q=141.1, df=9, p<0.001). Given the effect of time observed with top *Health* journals and AIM listed journals, and the fact that time was also a significant modifier of UPs in India ( $p_{M-RC}$  for on time=0.074, pseudo-R<sup>2</sup>=66%; UPs from 4 studies demonstrated 7% annual increase in odds to address URM, from 54% in 2005 to 71% in 2015)<sup>67, 115, 165, 166</sup> the results from different countries were not summarized. The lowest UP was reported for Korea in 1997 (2%, 95% CI 0-6%),<sup>27</sup> while only two regions had UPs higher than 50% (Latin America and Caribbean in 2012 with UP 61%, 95% CI 47-73%;<sup>111</sup> and India with 75%, 95% CI 63-83% in 2014,<sup>165</sup> and 67%, 95% CI 54-78% in 2015<sup>166</sup>). The study on Korean journals also reported percentages for subgroups of Medical Association member journals (UP 0%, 95% CI 0-7%) and quasi member journals (UP 2%, 95% CI 0.4-13%).<sup>27</sup> One study on Indian journals in 2005 reported percentages for ICMJE endorsing Health Sciences journals (UP 75%, 95% CI 55-88%) and non-endorsing journals (UP 49%, 95% CI 34-64%), as well as Medline indexed Health Sciences journals and non-indexed journals (summary UP 58%, 95% CI 46-70%).<sup>67</sup> Another study, by the same first author, looked at the almost the same journals in 2008 and reported percentages for ICMJE endorsing Health

Sciences journals (EP 91%, 95% CI 71-97%) and non-endorsing journals (EP 61%, 95% CI 47-74%), as well as MEDLINE indexed Health Sciences journals (EP 60%, 95% CI 45-72%) and non-indexed journals (EP 35%, 95% CI 18-57%).<sup>115</sup>

(Note: as specialty, database indexation, time and country effects were demonstrated in the paragraphs above, studies that reported combination of those characteristics were not included in pooled analyses.<sup>54, 58, 73, 74, 108, 120, 121, 157, 163</sup>) One of these studies, in 2013, showed a statistically significant difference (at  $P=0.1$ ) between MEDLINE indexed Health Sciences pharmacy journals (UP 60%, 95% CI 36-80%) and non-indexed journals (UP 83%, 95% CI 61-94%), no significant differences between PMC indexed and non-indexed journals (summary UP 73%, 95% CI 55-85%), and significant differences ( $P=0.028$ ) between ICMJE endorsing (UP 93%, 95% CI 69-99%) and non-endorsing journals (UP 58%, 95% CI 36-77%). (Note: As can be seen from the wide range of CIs, the study was slightly underpowered due to study groups consisting of 11 to 22 journals).<sup>121</sup>

#### *Association between citation metrics and addressing of URM in Health Sciences journals*

Five studies reported UPs for *Health Sciences* sub-disciplinary journals in relation to their IF values.<sup>80, 101, 103, 163, 173</sup> These UPs were quite homogeneous ( $I^2=14\%$ ,  $Q\text{-value}=14.0$ ,  $df=12$ ,  $p=0.302$ ) with the summary UP of 59% (95% CI 53-65%). Nevertheless, due to previously shown effects of time, we additionally performed meta-regression using time and IF category as covariates. After we grouped subdiscipline UPs by the average IF factor of journals UPs were assigned to into categories  $IF<1$ ,  $\geq 1-2$ ,  $\geq 2-3$ ,  $\geq 3$ ; we found a significant effect of IF on UPs of journals belonging to the highest, in comparison to the lowest IF category ( $p_{RC\ IF\geq 3\ vs\ IF<1}=0.033$ ,  $pseudo-R^2=49\%$ ). Namely, if a journal is assigned to the category  $IF\geq 3$ , its odds of addressing URM in ItAs increase by 2.8 times relative to the lowest category (UP of 74% vs 50%, respectively). Contrary, significant effect of time or lower IF categories on UPs were not



observed ( $p_{M-RCs} \geq 0.261$ ). (Note: we cannot exclude that low heterogeneity of rates and non-significant effect of time might be attributed to underpowered analysis or a relatively short time span, between 2008 to 2016).

One study (which did not report data in a way that would allow for meta-analysis) reported no significant association between IF and UP.<sup>165</sup>

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